

In the Claims:

1. (Cancelled).

2. (Cancelled).

3. (Original) A procedure used for extracting murmur information, characterised in that it comprises the following steps:

- obtaining a digital representation of heart sound for a predetermined number of seconds,
- identifying the time of occurrence of the first and second heart sounds in each cycle,
- windowing the parts of heart sounds falling between the first and second heart sounds, and second and first heart sounds, respectively
- decomposition of the signals into a predetermined first number $n1$ of frequency bands, each band being decomposed into a predetermined second number $n2$ of time-slices
- obtaining a systole (SP) and a diastole (DP) power vector consisting of the sum of $n1$ powers measured in each of the $n2$ time slices
- for each combination of a frequency band and a time slice, the power values from the different systoles are compared, and the median value is chosen to be the standard value for a power vector
- obtaining a systole (SMF) and a diastole (DMF) mean frequency vector by weighting the power value for each of $n1$ frequency bands with the mean frequency of the corresponding band, summing the results and dividing the sum by the corresponding element in the respective systole or diastole power vector
- while using the time of occurrence of the intensity vectors of the various classes for classifying the time distribution of murmurs.

4. (Original) A procedure for extracting murmur information according to claim 3, characterised in that a step preceding the step of obtaining systole and diastole murmur intensity vectors SI and DI consists of refining the windowing by setting the values of SP, DP, SMF, and DMF of the first or last elements equal to the second or last-but-one

values, respectively, if the values of the first or last elements of the corresponding vectors fulfil predetermined deviation criteria.

5. (Original) A procedure according to claim 3, c h a r a c t e r i s e d i n that further steps are included in the procedure, comprising

- subjecting the signal to double differentiation before decomposition
- obtaining a systole (SI) and diastole (DI) murmur intensity vector, respectively, by taking the logarithm of the corresponding SP and DP vectors,
- classifying the obtained logarithmic vectors into murmur intensity classes
- comparing the energy distributions to a catalogue of distributions related to known medical conditions.

6. (Original) An apparatus for performing the procedure according to claim 1, c h a r a c t e r i s e d i n that it comprises analog-to-digital means for converting a heart sound signal into sampled data, means for extracting the first and second heart sounds by classification according to energy levels, means for eliminating the contribution of the said first and second heart sounds from the signal, means for performing spectral analysis, means for performing feature enhancement, and multiplication means for obtaining the energy content present in areas of a time-frequency representation delimited by frequency band multiplied by time interval in the form of energy distributions means for classifying the energy distributions according to pre-defined criteria, and comparator means for comparing the energy distributions to a catalogue of distributions related to known medical conditions.

7. (Currently Amended) An apparatus for performing the procedure according to claim 10, wherein signal processing means are used to produce a spatial sound distribution from a single-channel input based on frequency, a low frequency band being delivered to a first earpiece of a headphone and a high frequency band being delivered to a second earpiece of said headphone, the frequency bands containing first and second heart sounds and murmur sounds respectively.

8. (Original) An apparatus according to claim 7, wherein said signal processing means produce a temporal sound distribution, sound signals being first delivered to a first earpiece of the headphone and then being delivered to a second earpiece of the headphone.

9. (Currently Amended) An apparatus according to claim 7 or 8, for performing the procedure according to claim 1, wherein signal processing means are used to produce a spatial sound distribution based on frequency, a low frequency band being delivered to a first earpiece of a headphone and a high frequency band being delivered to a second earpiece of said headphone, the frequency bands containing first and second heart sounds and murmur sounds respectively; and wherein said signal processing means comprise at least one Wiener filter.

10. (New) A procedure for extracting information from a phonocardiographic signals obtained from a transducer and subjected to signal processing including identification of characteristic signal components, comprising the steps of:

detecting first and second heart sounds and placing them correctly on a time axis by performing the steps of:

extracting the first and second heart sounds by classification according to energy levels,

then performing instantaneous power and lowpass filtering of the original phonocardiographic signal by performing spectral analysis and feature enhancement to obtain the energy content present in areas of a time-frequency representation delimited by frequency band time intervals in the form of energy distributions,

classifying the energy distributions according to pre-defined criteria,

comparing the energy distributions to a catalogue of distributions related to known medical conditions, and

outputting values for any medical conditions found.